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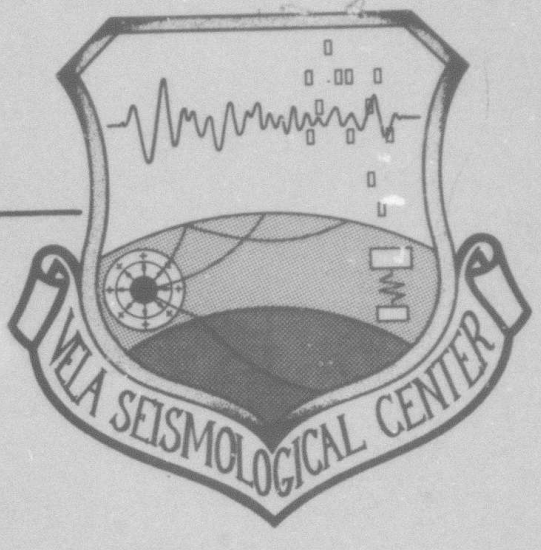
VSC-FR-82-01

SEISMIC SOURCE IDENTIFICATION RESEARCH - FINAL REPORT



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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report summarizes work performed on seismic source identification research during the contract period 1 May 1980 through 31 March 1981. The work was performed under contract F08606-80-C-0017. The report contains abstracts from the technical reports which summarize the research performed on seismic event identification and the design of an event identification package.

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SEISMIC SOURCE IDENTIFICATION RESEARCH - FINAL REPORT

SEISMIC DATA ANALYSIS CENTER REPORT NO.: SDAC-TR-82-2

AFTAC Project Authorization No.:	VELA T/0707
Project Title:	Seismic Source Identification Research
ARPA Order No.:	2551
Name of Contractor:	TELEDYNE GEOTECH
Contract No.:	F08606-80-C-0017
Date of Contract:	1 May 1980
Amount of Contract:	$144,164
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Project Manager:	Robert R. Blandford (703) 836-3882

P. O. Box 334, Alexandria, Virginia 22313

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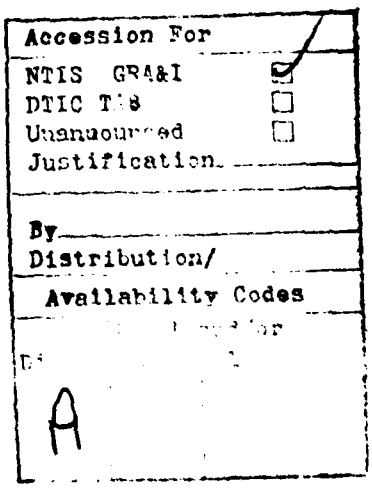

ABSTRACT

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TABLE OF CONTENTS

I. INTRODUCTION

This final report summarizes work performed by Teledyne Geotech from 1 May 1980 through 31 March 1981 under contract number F08606-80-C-0017. This report fulfills data item 008A2 of the Contract Data Requirements List (CDRL).

Section II of this report deals with a review of seismic event identification which was completed during the contract, and Section III discusses the work which was performed on the Discrimination and Identification of Seismic Events (DISE) package. Section IV pertains to item 4.3 of the contract, which was subsequently deleted.

Under the task for reviewing seismic event identification, a technical report and a technical memorandum were written. These documents dealt with techniques for seismic discrimination, particularly those methods which were used in the experiment conducted by the VELA Seismological Center (VSC).

Under the task for interactive event identification, a technical report was written describing a computer program which permits an investigator to utilize event location and waveform information to perform seismic discrimination.

II. REVIEW OF SEISMIC EVENT IDENTIFICATION (Task 4.1)

During the contract period one technical report was written describing the event identification experiment conducted in 1979 by the VELA Seismological Center (VSC), its relation to previous event identification research, and its bearing on the design of future systems for performing seismic discrimination. In addition, a technical memorandum was distributed which concentrated on one particular discrimination technique, the Variable-Frequency Magnitude (VFM) discriminant.

The technical report has been distributed to those on the government-approved list of recipients of classified reports. The memorandum was distributed to members of the research staff at Teledyne Geotech and at VSC.

The technical report, which has been classified SECRET, is:

An Evaluation of the VSC Discrimination Experiment (U)
(VSC-TR-81-12)

The technical memorandum is: "The VFM Discriminant", dated 15 May 1981.

In addition to this memorandum, a regular monthly letter was issued describing progress made during the reporting period on both the review of seismic event identification and the interactive event identification procedures.

III. INTERACTIVE EVENT IDENTIFICATION PROCEDURES (Task 4.2)

During the contract period an interactive computer program was written which is aimed at facilitating the data file manipulation and statistical decision-making tasks in a seismic event identification system. A technical report describing this computer program and the environment in which it operates has been submitted to the VELA Seismological Center for final approval. The title and a summary of this report follows:

DISE, An Interactive Discrimination Program for Seismic Events (VSC-TR-82-4)

DISE (Discrimination and Identification of Seismic Events) is an interactive computer program with graphics support and currently runs on a VAX-11/780 computer at the SDAC. Using various commands which are available, the seismic analyst may employ location data or waveform measurements to identify unknown events. Groups of epicenters may be formed, and a lower level of subgroups is formed when particular stations or variables are selected for discrimination purposes. The program supports two basic approaches to event identification using waveform-derived data: multivariate discrimination functions or multivariate clustering.

IV. WAVEFORM ANALYSIS PACKAGE (Task 4.3)

In accordance with instructions from VSC, no work was performed on this task.